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an inotropic agent after CPB. However, we hope some of the questions may be answered by the results of the TRICC study.

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References

1. Mackie AS, Booth KL, Newburger JW, Gauvreau K, Huang SA, Laussen PC, et al. A randomized, double-blind, placebo-controlled pilot trial of triiodothyonine in neonatal heart surgery. *J Thorac Cardiovasc Surg.* 2005;130:810-6.
2. Plumpton K, Haas NA. Identifying infants at risk of marked thyroid suppression post-cardiopulmonary bypass. *Intensive Care Med.* 2005;31:581-7.
3. Portman MA, Fearneyhough C, Karl TR, Tong E, Seidel K, Mott A, et al. The Triiodothyronine for Infants and Children Undergoing Cardiopulmonary Bypass (TRICC) study: design and rationale. *Am Heart J.* 2004;148:393-8.
4. Dittrich S, Aktuerk D, Seitz S, Mehwald P, Schulte-Monting J, Schlensak C, et al. Effects of ultrafiltration and peritoneal dialysis on proinflammatory cytokines during cardiopulmonary bypass surgery in newborns and infants. *Eur J Cardiothorac Surg.* 2004;25:935-40.
5. Van den Berghe G, de Zegher F, Lauwers P. Dopamine suppresses pituitary function in infants and children. *Crit Care Med.* 1994;22(11):1747-53.

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Reply to the Editor:

We appreciate the interest of Haas and Camphausen in our recently published trial of triiodothyronine (T3) in neonatal heart surgery.[1] The points they raised are addressed below.

Our center, like many other centers performing infant heart surgery in the United States, routinely uses high-dose intravenous loop and thiazide diuretics rather than peritoneal dialysis to manage postoperative fluid overload. We agree that the results of our study cannot be generalized to patients who are treated with peritoneal dialysis.

The inotrope score used in our study, adapted from Wernovsky and associates,[2] was determined by the use of dopamine, dobutamine, milrinone, epinephrine, and norepinephrine. The cumulative dose of dopamine in particular did not differ between treatment groups during the first 5 days after the operation. Vasodilator use was also similar between treatment groups: milrinone was used routinely in our patients, with no difference in cumulative milrinone dose between treatment arms at 5 days. A single patient (randomized to the T3 group) received nitroprusside; no patients received phenoxybenzamine. Amiodarone was not used in any subject.

We planned our trial so that cardiac output was one of two primary outcome measures. The technique used (direct measurement of oxygen consumption by real-time gas exchange) provides an objective determination of cardiac output in children who are sedated, ventilated, and stable.[3] During the study period, infants were weaned from mechanical ventilation at increasingly shorter times after surgery, rendering this measurement infeasible at 48 hours after surgery in several subjects. However, the proportion of patients in each treatment group in whom this end point could not be measured (9/22 in the T3 group and 5/20 in the placebo group) was not statistically significant ($P = .34$).

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References

1. Mackie AS, Booth KL, Newburger JW, Gauvreau K, Huang SA, Laussen PC, et al. A randomized, double-blind, placebo-controlled pilot trial of triiodothyronine in neonatal heart surgery. *J Thorac Cardiovasc Surg.* 2005;130:810-6.
2. Wernovsky G, Wypij D, Jonas RA, Mayer JE Jr, Hanley FL, Hickey PR, et al. Postoperative course and hemodynamic profile after the arterial switch operation in neonates and infants: a comparison of low-flow cardiopulmonary bypass and circulatory arrest. *Circulation.* 1995;92:2226-35.
3. Chang AC, Kulik TJ, Hickey PR, Wessel DL. Real-time gas-exchange measurement of oxygen consumption in neonates and infants after cardiac surgery. *Crit Care Med.* 1993;21:1369-75.

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A new modeling for each population

To the Editor:

I read with great interest the recently published study by Fakler and associates[1] in the August 2005 issue of the *Journal.* They found, in their investigation, a poor agreement between the measured oxygen consumption (VO_2) and the VO_2 estimated using the formulas of Krovetz and Goldbloom[2] and LaFarge and Miettinen.[3] According to the Krovetz-Goldbloom formula, the mean difference was -53 mL/min/m^2 and the limits of agreement were -95.5 and -11.1 mL/min/m^2 for the lower and upper limits, respectively. Use of the Krovetz-Goldbloom formula led to a systematic and significant overestimation in VO_2 values ($P = .0001$). However, a significant correlation was shown between measured and assumed VO_2 values with this formula ($R = .61$; $P = .0001$). According to the LaFarge-Miettinen formula, the mean difference was -15.6 mL/min/m^2 and the limits of agreement were -120.0 and 88.8 mL/min/m^2 for the lower and upper limits, respectively. A systematic and significant overestimation was also reported using the LaFarge-Miettinen formula. A significant correlation was, however, indicated between measured and assumed VO_2 with this model ($R = 0.38$; $P = .0037$). I speculated that the reason that the measured VO_2 values were significantly different from the assumed VO_2 using both Krovetz-Goldbloom and Lafarge-Miettinen formulas was because of a methodologic weakness in statistics and modeling.

As discussed by the authors, these differences between measured VO_2 and VO_2 estimated by the formulas might be due to a difference of population. I agree with this statement, but more credible is the argument that these differences are explained by the coefficients of these formulas (Krovetz-Goldbloom formula: $VO_2 = a \cdot \text{height} + b \cdot \text{weight} - c$; Lafarge-Miettinen formula: $VO_2 = a' - b' \cdot \ln(\text{age}) + c' \cdot$ heart rate for male subjects and $VO_2 = a' - b'' \cdot \ln(\text{age}) + c' \cdot$ heart rate for female subjects). These coefficients (a, b, c and a', b', b'' and c') depend on the characteristics of the population included in the study. That is why the use of published formulas without any coefficient correction cannot be applied in other populations, as shown in another study.[4] To overcome this problem, new formulas with new coefficients should be calculated from the population